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ABSTRACT

A matrix of characteristics associated with transformational leadership and with high reliability organizations was developed. Using the matrix as a lens, researchers examined a successful school involved in a school improvement effort to understand the success more fully. Transformational leaders provide opportunities for personal growth for employees as well as for improvement of the organization. A high reliability organization is one that works well and is consistently reliable. A matrix that displays the intersections between the characteristics of high reliability organizations and transformational leadership indicates substantial correspondence between the two, although some characteristics have no matches. The matrix was applied to an elementary school of 329 students, 72% of whom were on free/reduced price lunch. Data came from school improvement plans, a site visit with observations, teacher interviews, and a teacher questionnaire. The matrix suggests that in the successful school, transformational leadership and being a high reliability organization are highly related. (Contains 3 tables and 23 references.) (SLD)



High Reliability Organizations and Transformational Leadership as Lenses for Examining a School Improvement Effort

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High Reliability Organizations and Transformational Leadership as Lenses for Examining a School Improvement Effort

The interest in school leadership over the last two decades is rooted in the belief that leaders affect organizational performance (Gronn & Ribbins, 1996; Hallinger & Heck, 1996; Ogawa & Bossert, 1995). So strong is this belief that research findings regarding the importance of instructional leadership for school effectiveness (Edmonds, 1979; Rutter, Maugham, Mortimore, Ouston, & Smith, 1979) led rather abruptly to a change in the role of the principal from that of manager to that of instructional leader (Hallinger, 1992). Studies conducted in the last two decades have examined leader characteristics (Mazzarella & Grundy, 1991), leader behaviors (Bossert, Dwyer, Rowan, & Lee, 1982), and the effect of role on leader behavior (Pounder, Ogawa, & Adams, 1995; Smith, 1999). Recently, research on transformational leadership (Jantzi & Leithwood, 1996; Leithwood, 1994) has gained salience because these leader behaviors have been associated with successful school restructuring.

While leadership claimed a position in the education literature, a different body of research gained a foothold in the organizational literature, specifically, research on high reliability organizations (HROs). These studies explored organizations that operate without catastrophic failure (LaPorte & Consolini, 1991; Weick, 1987). Despite functioning in conditions of organizational complexity, such as the military (Roberts, 1990), and of great potential hazard, such as the nuclear



High Reliability Organizations & Transformational Leadership 3 power industry (Weick, 1987), HROs maintain a commitment to failure-free operations as the primary goal. HROs provide a useful contrast to organizations in which failure is considered unavoidable, such as the US automobile industry in the 1970s and 1980s, and US schools historically.

Our study investigates the intersection of these two bodies of research. Specifically, we develop a matrix of characteristics associated with transformational leadership and with high reliability organizations. Using this matrix as a lens, we examine a successful school involved in a school improvement effort to understand the success more fully. Before presenting the matrix, a brief review of research on transformational leadership and high reliability organizations is provided.

Transformational Leadership

The construct of transformational leadership is rooted in studies outside of education (Bass, 1985; Burns, 1978). Bass, Burns, and Avolio and Bass (1988) describe two domains of leadership, transformational and transactional.

Transactional leadership has been characterized as a quid pro quo, or exchange relationship. Transactional leaders provide rewards to employees in return for desired performance. Conversely, transformational leaders provide opportunities for personal growth for employees as well as for improvement of the organization.

Specifically, these leaders link employees' sense that their own goals can be achieved by helping the organization prosper. This linkage builds a strong sense of



High Reliability Organizations & Transformational Leadership 4 commitment to the success of the organization and creates motivation among employees to put forth the extra effort needed to ensure that success.

Leithwood (1994) adapted the transformational leadership model to schools. His interest in transformational leadership springs from the ambiguities of school restructuring. He explains that because neither the means nor the ends of restructuring are clearly articulated, school leaders who can build commitment among faculty are needed. He contrasts this image of leadership with conceptualizations of instructional leaders, who he maintains were oriented toward controlling staff. While controlling staff may have been appropriate when school reform goals were narrowly restricted to raising test scores, Leithwood argues that control diminishes the likelihood that genuine change in teachers' practices will occur. Changing teaching practices is as central to school restructuring as altering roles and relationships; transformational leadership is needed for restructuring reforms to be successful, according to Leithwood.

Leithwood (1994) and Jantzi and Leithwood (1996) identify six dimensions of transformational school leadership, and Leithwood (1994) specifies practices associated with each (see pp. 507, 510-512). The first dimension is the identification and articulation of a vision. Leithwood explains that leaders vary their approach to accomplishing this task; some promote their vision, others develop a vision collaboratively with staff and others. In either case, however, transformational



High Reliability Organizations & Transformational Leadership 5 leaders clarify the meaning of the vision in the context of school programs and teacher practices. In addition, the vision is continuously espoused by the leader through communications with staff, students, and parents.

The second dimension of transformational leadership posited by Leithwood (1994) is building consensus around school goals. One strategy leaders use is to "assist...staff in developing consistency among school vision, school, and/or department goals and individual goals" (Leithwood, 1994, p. 510). This intertwining of personal with organizational goals is a hallmark of transformational leadership. In this context, Leithwood found that school leaders regularly engage staff in monitoring progress toward both sets of goals, and use these goals as a foundation for decision making.

Offering individualized support is another dimension of transformational leadership identified by Leithwood (1994), and one that is linked to goal realization. By getting to know teachers' interests and strengths, and connecting these with goals, the leader promotes both individual and school improvement. Knowing the staff well enables the leader to support and encourage teachers' efforts to implement better practices. Transformational leaders are approachable; they help troubleshoot when efforts go awry, and offer recognition for successes.

Creating circumstances for intellectual stimulation is a fourth dimension of transformational leadership. Instrumental to this dimension is for the leader to



High Reliability Organizations & Transformational Leadership 6 "challenge...[teachers'] basic assumptions about their work as well as unsubstantiated or questionable beliefs and practices" (Leithwood, 1994, p. 511). Various forms of staff development are important to this dimension, including promoting a professional exchange among the staff, visiting other schools, attending conferences, and examining and improving practice. Leithwood is careful to note that a transformational leader "removes penalties for making mistakes as part of efforts toward professional and school improvement" (p. 511).

A fifth dimension noted by Leithwood (1994) is modeling desired practice. Transformational leaders are respectful of teachers and students, recognize the authentic effort of both, strive to do their best, solicit and value feedback, and work with teachers in all activities at the school. These leaders are also enthusiastic, hard working, and have a sense of humor.

The last dimension Leithwood (1994) describes is holding high expectations for performance. By advocating norms of excellence, transformational leaders promote innovation, professionalism, and hard work while providing flexibility for the use of judgment within the context of school goals.

Leithwood (1994) also described aspects of structure and culture that are impacted by transformational leadership. Transformational leaders shape the governance structure by "distribut[ing] the responsibility and power for leadership widely through the school" (p. 511). Doing so entails involving teachers in decision



High Reliability Organizations & Transformational Leadership 7 making and problem solving. Time is made available for collaborative planning, information seeking, and decision making.

School culture is affected by all of the above practices. By being "sensitive to organization building" (Leithwood, 1994, p. 501), transformational leaders strengthen the school culture. Incorporated into the school vision as part of organization building is "the care and respect of students" (Leithwood, 1994, p. 512). To maintain the culture, transformational leaders promote use of the vision, goals, and norms as a guide for the hiring staff.

High Reliability Organizations

LaPorte and Consolini (1991) describe high reliability organizations (HROs) as "working in practice but not in theory" (p. 19) to distinguish operating procedures followed by HROs from failure-tolerant organizations that rely on trial-and-error as a learning and decision making mechanism. As a society, we do not give much thought to HROs, though daily living brings continual contact with them. These organizations go unnoticed precisely because they are consistently reliable. HROs include drinking water systems, air traffic control, banks, telecommunication networks, nuclear power plants, and hospital blood supplies (Taylor, 1997).

The primacy of failure intolerance for HROs is rooted in the devastating consequences that a major failure entails; devastating for the public and for the organization. The consequences of failure makes "reliability...a more pressing issue



High Reliability Organizations & Transformational Leadership 8 than efficiency" for an HRO, according to Weick (1987, p. 112). Said another way, HROs promote a systemwide perspective that reliable operation is the primary outcome (Klein, Bigley, & Roberts, 1995).

Researchers have identified various characteristics of HROs. Foremost among them is an overriding commitment to failure free operations (Roberts, 1990; LaPorte & Consolini, 1991). Sustaining this commitment requires such attributes as clear goals (LaPorte & Consolini, 1991; Bierly & Spender, 1995) with goal commitment permeating the organization (Roberts & Gargano, 1994), shared cultural norms (Klein et al, 1995; Bierly & Spender, 1995), careful staff recruitment (LaPorte & Consolini, 1991; Bierly & Spender, 1995), extensive training of staff (Klein et al., 1995; Pool, 1997; Roberts & Gargano, 1990), early detection and correction of errors (LaPorte & Consolini, 1991), and redundant systems (Klein et al., 1995, Roberts, 1990; Bierly & Spender, 1995) that provide backup in the case of breakdown.

Roberts (1990) investigated operations on nuclear aircraft carriers, identified for study because of the complexity and high reliability of operations. Describing these carriers as "a city with 6,000 men and an airport on the roof" (p. 162), she notes that "150 - 200 men fuel, load ordnance aboard, and maintain aircraft that come and go in 48- to 60-second intervals" (p. 165). Multiple opportunities for error exist – engine damage from debris on the runway, launch failure, failure in arresting landings, collisions on deck – all with potential for catastrophic results. Yet



High Reliability Organizations & Transformational Leadership 9 such errors are rare because of the commitment to failure-free operations. Roberts captured the preeminence of this goal in a retort to her questions from the commanding officer on the carrier.

Sometimes I think you don't keep your eye on the goal around here. The primary goal is to get the planes off the pointy end of the ship and back down on to the flat end without mishap. (p. 172)

The commitment to failure free operations overrode even the strongly entrenched hierarchy of the military. Again, Roberts (1990) explains.

On carriers even the lowest level participant can abort landings. Because ingesting foreign objects can ruin jet engines (and possibly everyone's day on the flight deck) when anyone sees a foreign object on the deck he can call a halt to flight operations. While one would not want to make mistakes about such things very often, mistakes are not punished in this situation.... Rank is not an issue here. (p. 171)

As illustrated in the above quotation, decision making in HROs devolves to the lowest level at which expertise exists. Hierarchies of authority dissolve in the face greater expertise in a critical situation.

One reason HROs maintain high reliability is that personnel are carefully recruited and extensively schooled. Standard operating procedures (SOPs) are comprehensive and, as Pool (1977) notes, "training is devoted to making them



High Reliability Organizations & Transformational Leadership 10 second nature" (p. 40; Bierly & Spender, 1995; Klein et al, 1995). Personnel are taught to remain alert to flaws in SOPs and to report small failures (Roberts, 1990) so that changes can be made before the minor problems "cascade into major, systemwide problems and failures" (LaPorte & Consolini, 1991 p. 27). Under normal circumstances SOPs are strictly followed, but in unusual, potentially hazardous situations, deviating from standard practice is expected so that an accident can be circumvented (Roberts, 1990).

Two other attributes that allow HROs to operate without failure is that the mission, goals, and norms of the organization are clear, widely known, and agreed upon (LaPorte & Consolini, 1991), and communication and cooperation are considered essential (Bierly & Spender, 1995; Klein et al., 1995). LaPorte and Consolini (1991) describe the conditions faced by air traffic controllers during peak hours. For several hours at a time, controllers track up to 25 airplanes simultaneously on a radar screen. As a sector fills to overload capacity, a second controller quietly joins, providing an "extra pair of eyes" (p. 33) to detect potential problems before they fully evolve and to offer the primary controller suggestions, not directives, for correction.

The last attribute of HROs we will discuss is redundant systems (Roberts, 1990; Bierly & Spender, 1995). Because of the importance of communications in HROs, both Roberts and Bierly and Spender describe redundant communication



High Reliability Organizations & Transformational Leadership 11 systems that enable operations in times of crisis. In her report on nuclear aircraft carriers, Roberts notes that there are "more than 20 communication devices to contact critical parts of the ship, ranging from radios to sound powered phones" (p. 165). This redundancy allows important information to be related to the flight deck and aircraft even after damage has occurred to the ship, as could be the case in war.

Similarly, Bierly and Spender describe the redundant procedures for ensuring that orders for operating a submarine are carried out as intended. Orders are given by an engineer, for example to open a valve to maneuver the sub. The orders are repeated by the operator to whom they given. The orders are carried out and the operator reports to the engineer the action that was taken. The engineer acknowledges the action and charts the change. All of these procedures are overseen by a senior petty officer. As Bierly and Spender explain, this "apparently redundant formality...helps to establish crisis-resistant patterns of communication and behavior" (p. 648).

Matrix of Characteristics of HROs and Transformational Leadership Practices

The purpose of our paper is to examine the intersection between characteristics of high reliability organizations and characteristics of transformational leadership identified by Leithwood (1994). A matrix of these characteristics is presented in Table 1.

The matrix indicates substantial correspondence, including clear goals that



High Reliability Organizations & Transformational Leadership 12 permeate the organization, shared cultural norms, continuous monitoring, identifying flaws in procedures and making changes, emphasis on careful recruitment and ongoing training of personnel, not punishing decisions consistent with goals if the decisions go awry, maintaining cooperation and communication, and a high degree of responsibility and accountability.

One characteristic of transformational leadership, modeling good professional practice, does not have a match among the characteristics of HROs. The hierarchical nature of the HROs studied and the extensiveness of the training provided to personnel, likely made this attribute less applicable to HROs.

Characteristics of HROs that have no matches among transformational leadership practices are a systemwide perspective regarding reliability as a primary outcome, redundant systems, and authority patterns that shift based on expertise not hierarchy. Although educators espouse a conviction that all students can learn, this belief seldom translates into a commitment to have all students actually learn and not fail. Transformational leadership practices are no exception. Concerning redundant systems, one could argue that schools are structured to be redundant; that the first month or so of school each year is devoted to review of prior learning. However, establishing redundant systems to prevent failure is not a leadership practice noted by Leithwood (1994). Finally, while Leithwood describes transformational leaders sharing decision making authority widely throughout the



High Reliability Organizations & Transformational Leadership 13 school and supporting experimentation with innovations, we could find no discussion of leaders deferring to greater expertise among the faculty on such things as critical programmatic decisions.

Application of the Matrix to a School Restructuring Effort Description of the Schools and Data Collection Methods

We used data collected from a school in a southern district of approximately 57,000 students. The school, Sheryll Heights Elementary¹, enrolled 329 students, 72% of whom were on free/reduced price lunch, in grades pre-K-5.

Our data came from four sources. School improvement plans were analyzed to determine the emphasis of improvement efforts. In addition, a team of four researchers visited each school to interview about 33% of the teachers regarding the plan and efforts to implement it. During the school visit, observations were conducted in approximately 40% of the classrooms per school to obtain evidence of plan implementation. Finally, teachers completed a questionnaire that included items concerning principal leadership and shared decision making.

The school improvement plan targeted increasing students' reading ability, using hands-on strategies in math, providing small group instruction, and integrating computers into instruction. These priorities were observed in classrooms and discussed by teachers who were interviewed.



¹All names used in the manuscript are pseudonyms.

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Table 2 presents the transformational leadership practices present at Sheryll

Heights. Although neither the principal nor the teachers at Sheryll Heights

Elementary mentioned the school vision during interviews, teachers were enthusiastic about the school improvement program and consensus about school goals was solidifying. In this regard, teachers made such comments as:

"We are all working together toward the same goals;" and

"The...program allows us to work together as a team; everyone is helpful;" and

"Teachers had input into developing the [school improvement] plan. Teachers feel more supportive of the plan because of that."

Funds from several sources were combined to provide special programs for students. For example, a reading specialist worked with those youngsters identified as at risk of being non-readers. In addition, the schedule and assignment of students to class were altered to allocate a block of time each day for reading instruction. All professional staff, including the principal, guidance counselor, and special programs teachers taught reading during this time. Lower class size and cross-age reading groups were created by these changes allowing students to be instructed at their skill level. Both reading programs were seen as effective by the faculty, and the principal noticed a heightened commitment from all teachers to students' success as readers.



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Similarly, attention to developing students' math proficiency was a priority.

To provide a math specialist, funding was shared with another elementary school, giving each school access to the specialist part-time. The specialist not only provided staff development for using hands-on and small group strategies to teach math concepts, but also taught demonstration lessons which teachers found very helpful.

Strategies for both reading and math had the effect of creating "an extra pair of eyes" for detecting problems early and fashioning solutions that LaPorte and Consolini (1991) mentioned. Moreover, the principal modeled practices she expected of teachers, valuing student learning and placing administrative duties in abeyance daily in order to teach reading.

The leadership of the principal and the emphasis on effective teaching of reading and math had an effect on the culture of the school. Teachers began to collaborate with each other to plan and develop lessons, and to observe classrooms at other schools as a source of new ideas for effective practices. They expressed a strong sense of their own efficacy with 90% of the responding teachers agreeing to the questionnaire item, "There is a great deal I can do to insure that all my students achieve at a high level." The effect on school culture also resulted in a notable sense of commitment on the part of teachers. Teachers expressed regret that the school did not have the program sooner, and many willingly stayed late into the afternoons developing new materials to make lessons "work" for students.



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In addition, the principal challenged teachers to put aside preconceptions about students' limitations and focus instead on student characteristics amenable to change through teachers' efforts. Teacher questionnaire items asked about specific principal behaviors. Ninety percent or more of the responding teachers agreed that the principal supported their efforts to improve student achievement, involved them in making decisions and developing school policies, and encouraged their participation in the school process. Spring testing of second and fourth graders resulted in average national percentile ranks in the second and third quartiles.

The characteristics of HROs present at Sheryll Heights are presented in Table 3. Many of these attributes are subsumed in the above discussion and will not be belabored here. Failure free operations was not a goal at Sheryll Heights Elementary, but a number of the HRO characteristics were evident at the school. Goals were widely agreed upon, and a norm of providing an excellent education was growing. Despite working with students from low-socio-economic backgrounds, 60% of the teachers responding to the questionnaire indicated that students were expected to achieve at or above the national norm. While this level of achievement did not occur, teachers' expectations remained high.

The involvement of all staff in teaching reading and the work of the math specialist help teachers detect problems in students' learning and seek assistance in resolving the difficulty. Staff development was on-going at the school with particular



High Reliability Organizations & Transformational Leadership 17 attention given to developing strategies for hands-on teaching and small student work groups, both of which were targeted in the school improvement plan. Cooperation and interaction among teachers, including the math specialist was professional and frequent. As noted, teachers were pleased with the improvement in students' math ability and attributed the progress to the math specialist. Teachers' sense of responsibility for student learning undergirded their willingness to stay after hours to prepare complex lessons.

Despite the willingness of the principal to involve teachers in decision making, there was no evidence that authority patterns shifted based on expertise. District policy and state law made such a shift unlikely and no one who was interviewed indicated that expertise overrode hierarchical authority. Given that faculty decisions did not supercede the principal's decisions, it is not surprising that there was also no evidence regarding consequences for incorrect decisions from teachers.

Discussion and Conclusions

Sheryll Heights Elementary has a leader who exhibits many of the characteristic practices Leithwood (1994) associates with transformational leadership. Similarly, there are many characteristics of HROs evident at the school. While our data do not directly measure espousal of the school vision, the frequency of communication, or the amount of individualized support offered, the principal had build a consensus about school goals that brought a sense of cohesion to the faculty.



High Reliability Organizations & Transformational Leadership 18 She modeled high performance expectations and communicated those expectations to others. Consensus about goals and support of high expectations were reflected in the choice of the math specialist who was hired and the commitment of teachers who worked late to provide an effective instructional program.

While our study is neither experimental nor causal in nature, the matrix we presented indicates that high reliability and transformational leadership are associated. Using these two lenses to examine school restructuring and improvement provides additional information regarding variables that promote school success. The results reported here are is consistent with research by Leithwood (1994) which suggests that transformational leadership and school improvement are strongly related. Our study is but an initial step in applying theory about high reliability organizations to school improvement. Nonetheless, there is sufficient evidence to suggest that continued examination of schools through the dual lenses of HROs and transformational leadership may provide the an end, if not the means, that Leithwood asserts is missing.

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Table 1 Matrix of Characteristics of Transformational Leadership and High Reliability Organization

	Espouses widely shared vision for the school	Builds consensus about goals and priorities	Hires staff who share vision/norms	Holds high performance expectations
Systemwide perspective that reliability is a primary outcome				-
Goal agreement permeates organization	•	•	•	
Shared cultural norms		•	•	
Continuous monitoring of system performance			,	•
Flaws in SOPs identified and changes suggested/validated				•
Redundant systems				_



Authority patterns shift based on expertise not hierarchy

Careful staff recruitment and training

No punishment when decisions consistent with goals are incorrect

Cooperation and communication are vital

High degree of responsibility and accountability

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Table 2 Characteristics of Transformational Leadership Practices Present at Sheryll Heights

Characteristic	Present at the School
Espouses widely shared vision for the school	N/O
Builds consensus about goals	•
Hires staff who share vision/norms	•
Holds high performance expectations	•
Uses frequent, direct communication	N/O
Provides frequent staff development	•
Provides individualized support	N/O
Provides intellectual stimulation	•
Models good professional practice	•

NOTE: N/O indicates "not observed."



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Table 3 Characteristics of HROs Present at Sheryll Heights

Characteristic Systemwide perspective	Present at the School
that reliability is a	
primary outcome	N/O
Goal agreement permeates organization	•
Shared cultural norms	•
Continuous monitoring of system performance	•
Redundant systems	N/O
Careful staff recruitment and training	•
Authority patterns shift based on expertise not hierarchy	N/O
,	14/0
No punishment when decisions consistent with	
goals are incorrect	N/O
Cooperation and	
communication are vital	•
High degree of respon-	
sibility and account- ability	•
	

NOTE: N/O indicates "not observed."





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